

**EXHIBIT 28**

Announcing the [OpenCorporates Trust](#) – a new entity that guarantees the OpenCorporates mission to open up company data for the public good. [Read more on our blog.](#)

# opencorporates

The Open Database Of The Corporate World

Company name or number  Search

☒ Companies ☐ Officers

- [My Account](#)
- [Logout](#)

## **SPECGX LLC** [branch](#)

Company Number

42656469Q

Status

Active In Good Standing

Incorporation Date

24 May 2017 (about 2 years ago)

Company Type

Limited Liability Company (Non-Louisiana)

Jurisdiction

[Louisiana \(US\)](#)

Branch

Branch of [SPECGX LLC](#) (Delaware (US))

**Controlling Company**

**MALLINCKRODT PUBLIC LIMITED COMPANY**

Registered Address

- 3867 PLAZA TOWER DR.  
BATON ROUGE, LA 70816
- United States

Agent Name

C T CORPORATION SYSTEM

Agent Address

3867 PLAZA TOWER DR., BATON ROUGE, LA 70816

**Directors / Officers**

- [C T CORPORATION SYSTEM](#), agent, 24 May 2017-
- **JOHN E. EINWALTER**, manager
- **KATHLEEN A. SCHAEFER**, manager
- **MARVIN HASELHORST**, manager

## Registry Page

<https://coraweb.sos.la.gov/commercia...>

**Source** Louisiana Secretary Of State, Commercial Division,  
<https://coraweb.sos.la.gov/commercia...>, 3 May 2019

Add data (website, address, etc)

update from registry

## Company Addresses

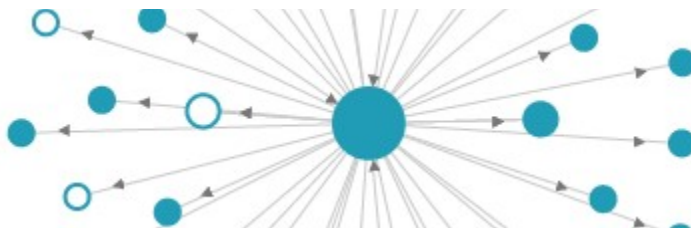
### Mailing Address

385 MARSHALL AVE, WEBSTER GROVES, MO 63119

### Head Office Address

385 MARSHALL AVE WEBSTER GROVES, MO 63119

## Explore company network



## Company network

Not yet available for this company. [Click to find out more](#)

## Corporate Grouping User Contributed


None known. [Add one now?](#)

[See all corporate groupings](#)

## Similarly named companies

[Found 21](#). Showing first 10

- **SPECGX LLC (Delaware (US), 14 Nov 2016- )**
- branch [SPECGX LLC](#) (Indiana (US), 27 Jun 2017- )
- branch [SPECGX LLC](#) (Maryland (US), 24 May 2017- )
- branch [SPECGX LLC](#) (New York (US), 4 May 2017- )
- branch [SPECGX LLC](#) (Nevada (US), 26 Jun 2017- )
- branch [SPECGX LLC](#) (California (US), 26 Jun 2017- )
- branch [SpecGx LLC](#) (North Carolina (US), 8 May 2017- )
- branch [SPECGX LLC](#) (Utah (US), 24 May 2017- )

-  branch [SPECGX LLC](#) (Florida (US), 24 May 2017- )
-  branch [SPECGX LLC](#) (Kentucky (US))

## Home company alpha

 [SPECGX LLC](#) (Delaware (US), 14 Nov 2016-) [details](#)

\* While we strive to keep this information correct and up-to-date, it is not the primary source, and the company registry ([see source](#), above) should always be referred to for definitive information

Data on this page last changed May 26 2019

**Problem/question about this data?** [Click here](#)

## Open Data

Get this info as [json](#), [xml](#), [rdf](#)

## About us

- [About](#)
- [Principles](#)
- [Blog](#)
- [Team](#)
- [Advisory board](#)
- [User/Cookie privacy policy](#)
- [Jobs](#)

## Using our data

- [Using our data](#)
- [What makes our data special](#)
- [Working for the public good](#)
- [Legal/Licence](#)
- [Public records privacy policy](#)
- [Contributing](#)

## Help

- [API Reference](#)
- [Glossary](#)
- [Status](#)

## Contact

- [Twitter](#)



- [Medium](#)
- [Newsletter](#)
- [Problems with our data?](#)
- [Temporary redaction](#)

## Impact

- [Impact](#)
- [Corporate network visualisations](#)
- [Research](#)



ROY COOPER  
*Governor*

MICHAEL S. REGAN  
*Secretary*

MICHAEL SCOTT  
*Director*

May 9, 2017

Mr. Timothy D. Roberts  
Principal Environmental Engineer  
Mallinckrodt-Raleigh Pharmaceutical Plant  
8801 Capital Boulevard  
Raleigh, NC 27616

Re: Class 1 Permit Modification Request  
Transfer of Ownership from Mallinckrodt LLC to SpecGx LLC  
Mallinckrodt Raleigh Pharmaceutical Plant  
NCD042091975

Dear Mr. Roberts:

This acknowledges receipt on May 1, 2017 of your request to transfer ownership of certain assets, including the facility located at 8801 Capitol Boulevard in Raleigh, from Mallinckrodt LLC into a separate but related company named SpecGx LLC. The Transfer of Ownership is approved as a Class 1 permit modification under 40 CFR 270.42 as adopted in 15A NCAC 13A .0113. To comply with 40 CFR 270.42, you must notify all persons on the enclosed mailing list, except for the State and EPA who have already been notified.

If you have any questions, please contact Katherine O'Neal at (919) 707-8209 or at [katherine.oneal@ncdenr.gov](mailto:katherine.oneal@ncdenr.gov).

Sincerely,

Julie S. Woosley, Hazardous Waste Section Chief  
Division of Waste Management, NCDEQ

cc: Ruffin Hall, Raleigh City Manager  
Jim Hartmann, Wake County Manager  
Jenne Walker  
Jenny Lopp  
Bud McCarty  
Katherine O'Neal  
Kathy Lawson



April 28, 2017

Julie Woosley, Chief  
Hazardous Waste Section, Waste Management Division  
North Carolina Department of Environment Quality  
217 West Jones Street  
Raleigh, NC 27603

**RE: Permit Modification Request- Change of Ownership  
Mallinckrodt LLC  
Permit Number NCD042091975**

Dear Ms. Woosley,

Mallinckrodt LLC (hereafter, Mallinckrodt) is hereby requesting a modification of the above referenced **Hazardous Waste Management Permit** issued by the North Carolina Department of Environmental Quality for the operation of the Mallinckrodt facility located in Raleigh, North Carolina. The requested modifications are for a change in ownership for the facility's corrective action activities. Further information regarding this permit modification request is provided below in accordance with 40 CFR 270.42(a).

***40 CFR 270.42(a)(1)(i) – Description of the Exact Changes to Be Made to the Permit Conditions***

The requested permit modifications pertain to the Hazardous Waste Part B Application General Permit Provisions and **Financial Assurance**, incorporated by reference as an attachment to the Hazardous Waste Management Permit. The exact changes being proposed are as follows:

1. **General Permit Provisions** – Changes in ownership or operational control of a facility, provided the procedures of § 270.40(b).

***40 CFR 270.42(a)(1)(i) – Explanation Why Changes are Necessary***

Effective July 29, 2017, Mallinckrodt LLC plans to transfer certain assets from **Mallinckrodt LLC** into a separate, related entity named **SpecGx LLC**. These assets include the Raleigh Plant located at 8801 Capital Boulevard, Raleigh, NC. This is part of a planned internal corporate reorganization. Both entities are indirect subsidiaries of Mallinckrodt plc, which is traded on the New York Stock Exchange under the symbol "MNK." There is no associated change in personnel or operations. However, because ownership of the plant is technically changing, we are providing the 90-day notice required by 40 CFR 270.42 for the plant's RCRA permit. **Financial assurance will remain in place at all times; after the transfer we will update it to reflect the name of SpecGx LLC and provide that to you.**

*Letter to Ms. Julie Woosley  
April 28, 2017  
Page 2*

**40 CFR 270.42(a)(1)(i) – Applicable Information Required by Sections 270.13 Through 270.21, 270.62, and 270.63**

A revised Part A permit application, in accordance with Section 270.13 is being submitted with this permit modification request (see Attachment). Sections 270.21, 270.62 and 270.63 are not applicable to the Mallinckrodt facility.

In addition, the above-referenced changes to the ownership will result in a new financial assurance mechanism for Corrective Action within six months of the date of the change. The current financial assurance will remain in place at all times; after the transfer it will be updated to reflect the name of SpecGx LLC.

**40 CFR 270.42(a)(2) – Identification of Change as a Class 1 Modification**

Mallinckrodt has identified the proposed changes as a Class 1 permit modification listed in Appendix I to 40 CFR 270.42. A Class 1 permit modification request requires prior approval from the NCDEQ. The applicable requested modifications are identified as A.7. The modifications are described as:

D. *General Permit Provisions*

7. Changes in ownership or operational control of a facility provided the procedures of § 270.40(b) are followed (Class 1).

**40 CFR 270.42(b)(2) – Notice of Modification Request**

Mallinckrodt will notify all persons on the facility mailing list and to the appropriate units of State and local government within 90 days after the NC DEQ's approval of this permit modification request.

**15A NCAC 13A .0113(l) and § 130A-295. Additional requirements for hazardous waste facilities.**

**(a) An applicant for a permit for a hazardous waste facility shall satisfy the Department that:**

- (1) Any hazardous waste facility constructed or operated by the applicant, or any parent or subsidiary corporation if the applicant is a corporation, has been operated in accordance, with sound waste management practices and in substantial compliance with federal and state laws, regulations and rules; and**
- (2) The applicant, or any parent or subsidiary corporation if the applicant is a corporation, is financially qualified to operate the proposed hazardous waste facility.**



*Letter to Ms. Julie Woosley  
April 28, 2017  
Page 3*

As explained above, this change is part of a planned internal corporate reorganization. Both entities are indirect subsidiaries of Mallinckrodt plc, which is traded on the New York Stock Exchange under the symbol "MNK."

SpecGx LLC is a new legal entity and has had no operations to date; however there is no associated change in personnel or operations as a result of the reorganization. Additionally, it has no compliance history to report. It will begin operations effective July 29, 2017. In addition to the financial assurance mentioned above, last year Mallinckrodt plc's revenues were approximately \$3.4 billion.

\* \* \* \* \*

Mallinckrodt appreciates the NCDEQ's assistance with the permit modification request. If you have any questions regarding this request, please call me at (314) 654-0138

Sincerely,

**Mallinckrodt LLC**




Tim Roberts  
Principle Environmental Engineer

Attachment

cc: Karen Burke, Mallinckrodt

**Submitted via Email and Fedex 779013108669**

OMB# 2050-0024; Expires 01/31/2017

<b>SEND COMPLETED FORM TO:</b> The Appropriate State or Regional Office.	<b>United States Environmental Protection Agency RCRA SUBTITLE C SITE IDENTIFICATION FORM</b>		
<b>1. Reason for Submittal</b>  MARK ALL BOX(ES) THAT APPLY	<b>Reason for Submittal:</b> <input type="checkbox"/> To provide an Initial Notification (first time submitting site identification information / to obtain an EPA ID number for this location) <input type="checkbox"/> To provide a Subsequent Notification (to update site identification information for this location) <input type="checkbox"/> As a component of a First RCRA Hazardous Waste Part A Permit Application <input checked="" type="checkbox"/> As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment # <u>13</u> ) <input type="checkbox"/> As a component of the Hazardous Waste Report (If marked, see sub-bullet below) <input type="checkbox"/> Site was a TSD facility and/or generator of >1,000 kg of hazardous waste, >1 kg of acute hazardous waste, or >100 kg of acute hazardous waste spill cleanup in one or more months of the report year (or State equivalent LQG regulations)		
<b>2. Site EPA ID Number</b>	EPA ID Number <u>N C D   0 4 2   0 9 1   9 7 5  </u>		
<b>3. Site Name</b>	Name: Mallinckrodt - Raleigh Pharmaceutical Plant		
<b>4. Site Location Information</b>	Street Address: 8801 Capital Boulevard		
	City, Town, or Village: Raleigh	County: Wake	
	State: North Carolina	Country: US	Zip Code: 27616
<b>5. Site Land Type</b>	<input checked="" type="checkbox"/> Private <input type="checkbox"/> County <input type="checkbox"/> District <input type="checkbox"/> Federal <input type="checkbox"/> Tribal <input type="checkbox"/> Municipal <input type="checkbox"/> State <input type="checkbox"/> Other		
<b>6. NAICS Code(s) for the Site (at least 5-digit codes)</b>	A. <u>3   2   5   4   1   1  </u>	C. <u>3   2   5   1   9   2  </u>	
	B. <u>3   2   5   1   9   9  </u>	D. <u>3   2   5   3   1   1  </u>	
<b>7. Site Mailing Address</b>	Street or P.O. Box: 8801 Capital Boulevard		
	City, Town, or Village: Raleigh		
	State: North Carolina	Country: US	Zip Code: 27616
<b>8. Site Contact Person</b>	First Name: Timothy		MI: D    Last: Roberts
	Title: Principal Environmental Engineer		
	Street or P.O. Box: 8801 Capital Boulevard		
	City, Town or Village: Raleigh		
	State: North Carolina	Country: US	Zip Code: 27616
	Email: tim.roberts@mallinckrodt.com		
	Phone: 919-878-2895	Ext.: NA	Fax: 919-878-2823
<b>9. Legal Owner and Operator of the Site</b>	A. Name of Site's Legal Owner: SpecGx LLC		Date Became Owner: 07/29/2017
	Owner Type: <input checked="" type="checkbox"/> Private <input type="checkbox"/> County <input type="checkbox"/> District <input type="checkbox"/> Federal <input type="checkbox"/> Tribal <input type="checkbox"/> Municipal <input type="checkbox"/> State <input type="checkbox"/> Other		
	Street or P.O. Box: 675 McDonnell Boulevard		
	City, Town, or Village: Hazelwood		Phone: 314-654-2000
	State: Mo	Country: US	Zip Code: 63042
	B. Name of Site's Operator: SpecGx LLC		Date Became Operator: 07/29/2017
	Operator Type: <input checked="" type="checkbox"/> Private <input type="checkbox"/> County <input type="checkbox"/> District <input type="checkbox"/> Federal <input type="checkbox"/> Tribal <input type="checkbox"/> Municipal <input type="checkbox"/> State <input type="checkbox"/> Other		

EPA ID Number ☐ N ☐ C ☐ D ☐ 0 ☐ 4 ☐ 2 ☐ 0 ☐ 9 ☐ 1 ☐ 9 ☐ 7 ☐ 5

OMB#: 2050-0024; Expires 01/31/2017

**10. Type of Regulated Waste Activity (at your site)**

Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

**A. Hazardous Waste Activities; Complete all parts 1-10.**

- Y ☒ N ☐ **1. Generator of Hazardous Waste**  
If "Yes," mark only one of the following – a, b, or c.
- ☒ a. LQG: Generates, in any calendar month, 1,000 kg/mo (2,200 lbs/mo.) or more of hazardous waste; or Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lbs/mo) of acute hazardous waste; or Generates, in any calendar month, or accumulates at any time, more than 100 kg/mo (220 lbs/mo) of acute hazardous spill cleanup material.
- ☐ b. SQG: 100 to 1,000 kg/mo (220 – 2,200 lbs/mo) of non-acute hazardous waste.
- ☐ c. CESQG: Less than 100 kg/mo (220 lbs/mo) of non-acute hazardous waste.

If "Yes" above, indicate other generator activities in 2-10.

- Y ☐ N ☒ **2. Short-Term Generator** (generate from a short-term or one-time event and not from on-going processes). If "Yes," provide an explanation in the Comments section.
- Y ☐ N ☒ **3. United States Importer of Hazardous Waste**
- Y ☐ N ☒ **4. Mixed Waste (hazardous and radioactive) Generator**

- Y ☐ N ☒ **5. Transporter of Hazardous Waste**  
If "Yes," mark all that apply.

- ☐ a. Transporter
- ☐ b. Transfer Facility (at your site)

- Y ☒ N ☐ **6. Treater, Storer, or Disposer of Hazardous Waste** Note: A hazardous waste Part B permit is required for these activities.

- Y ☐ N ☒ **7. Recycler of Hazardous Waste**

- Y ☐ N ☒ **8. Exempt Boiler and/or Industrial Furnace**  
If "Yes," mark all that apply.

- ☐ a. Small Quantity On-site Burner Exemption
- ☐ b. Smelting, Melting, and Refining Furnace Exemption

- Y ☐ N ☒ **9. Underground Injection Control**

- Y ☐ N ☒ **10. Receives Hazardous Waste from Off-site**

**B. Universal Waste Activities; Complete all parts 1-2.**

- Y ☐ N ☒ **1. Large Quantity Handler of Universal Waste** (you accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste managed at your site. If "Yes," mark all that apply.
- a. Batteries ☐
- b. Pesticides ☐
- c. Mercury containing equipment ☐
- d. Lamps ☐
- e. Other (specify) \_\_\_\_\_ ☐
- f. Other (specify) \_\_\_\_\_ ☐
- g. Other (specify) \_\_\_\_\_ ☐
- Y ☐ N ☒ **2. Destination Facility for Universal Waste**  
Note: A hazardous waste permit may be required for this activity.

**C. Used Oil Activities; Complete all parts 1-4.**

- Y ☐ N ☒ **1. Used Oil Transporter**  
If "Yes," mark all that apply.
- ☐ a. Transporter
- ☐ b. Transfer Facility (at your site)
- Y ☐ N ☒ **2. Used Oil Processor and/or Re-refiner**  
If "Yes," mark all that apply.
- ☐ a. Processor
- ☐ b. Re-refiner
- Y ☐ N ☒ **3. Off-Specification Used Oil Burner**
- Y ☐ N ☒ **4. Used Oil Fuel Marketer**  
If "Yes," mark all that apply.
- ☐ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
- ☐ b. Marketer Who First Claims the Used Oil Meets the Specifications

EPA ID Number [N][C][D][0][4][2][0][9][1][9][7][5]

OMB#: 2050-0024; Expires 01/31/2017

**D. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K**

❖ You can ONLY Opt into Subpart K if:

- you are at least one of the following: a college or university; a teaching hospital that is owned by or has a formal affiliation agreement with a college or university; or a non-profit research institute that is owned by or has a formal affiliation agreement with a college or university; AND
- you have checked with your State to determine if 40 CFR Part 262 Subpart K is effective in your state

Y ☐ N ☐ 1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories  
See the item-by-item instructions for definitions of types of eligible academic entities. Mark all that apply:

- ☐ a. College or University
- ☐ b. Teaching Hospital that is owned by or has a formal written affiliation agreement with a college or university
- ☐ c. Non-profit Institute that is owned by or has a formal written affiliation agreement with a college or university

Y ☐ N ☐ 2. Withdrawing from 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories**11. Description of Hazardous Waste****A. Waste Codes for Federally Regulated Hazardous Wastes.** Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

D001	D002	D003	D004	D008	D009	D022
D036	D038	F002	F003	F005	K083	U012
U080	U117	U122	U151	U169	U220	

**B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes.** Please list the waste codes of the State-Regulated hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

NA						



EPA ID Number 

N	C	D	0	4	2	0	9	1	9	7	5
---	---	---	---	---	---	---	---	---	---	---	---

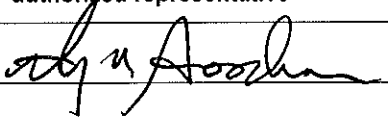
OMB#: 2050-0024; Expires 01/31/2017

**12. Notification of Hazardous Secondary Material (HSM) Activity**Y ☐ N ☒ Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 261.2(a)(2)(ii), 40 CFR 261.4(a)(23), (24), or (25)?

If "Yes," you must fill out the Addendum to the Site Identification Form: Notification for Managing Hazardous Secondary Material.

**13. Comments**

**14. Certification.** I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. For the RCRA Hazardous Waste Part A Permit Application, all owner(s) and operator(s) must sign (see 40 CFR 270.10(b) and 270.11).

Signature of legal owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
	Timothy M. Goodman, Site Director	04/28/2017

EPA ID Number N C D 0 4 2 0 9 1 9 7 5

OMB#: 2050-0024; Expires 01/31/2017

## ADDENDUM TO THE SITE IDENTIFICATION FORM: NOTIFICATION OF HAZARDOUS SECONDARY MATERIAL ACTIVITY

**ONLY fill out this form if:**

- ❖ You are located in a State that allows you to manage excluded hazardous secondary material (HSM) under 40 CFR 261.2(a)(2)(ii), 261.4(a)(23), (24), or (25) (or state equivalent). See <http://www.epa.gov/epawaste/hazard/dsw/statespf.htm> for a list of eligible states; **AND**
- ❖ You are or will be managing excluded HSM in compliance with 40 CFR 261.2(a)(2)(ii), 261.4(a)(23), (24), or (25) (or state equivalent) or you have stopped managing excluded HSM in compliance with the exclusion(s) and do not expect to manage any amount of excluded HSM under the exclusion(s) for at least one year. Do not include any information regarding your hazardous waste activities in this section.

**1. Indicate reason for notification. Include dates where requested.**

- ☐ Facility will begin managing excluded HSM as of \_\_\_\_\_ (mm/dd/yyyy).
- ☐ Facility is still managing excluded HSM/re-notifying as required by March 1 of each even-numbered year.
- ☐ Facility has stopped managing excluded HSM as of \_\_\_\_\_ (mm/dd/yyyy) and is notifying as required.

**2. Description of excluded HSM activity.** Please list the appropriate codes and quantities in **short tons** to describe your excluded HSM activity ONLY (do not include any information regarding your hazardous wastes). Use additional pages if more space is needed.

a. Facility code (answer using codes listed in the Code List section of the instructions)	b. Waste code(s) for HSM	c. Estimated short tons of excluded HSM to be managed annually	d. Actual short tons of excluded HSM that was managed during the most recent odd- numbered year	e. Land-based unit code (answer using codes listed in the Code List section of the instructions)

**3. Facility has financial assurance pursuant to 40 CFR 261.4(a)(24)(vi).** (Financial assurance is required for reclaimers and intermediate facilities managing excluded HSM under 40 CFR 261.4(a)(24) and (25))Y ☐ N ☐ Does this facility have financial assurance pursuant to 40 CFR 261.4(a)(24)(vi)?

EPA ID Number [N][C][D][0][4][2][0][9][1][9][7][5]

OMB#: 2050-0024; Expires 01/31/2017

United States Environmental Protection Agency  
**HAZARDOUS WASTE PERMIT INFORMATION FORM**

<b>1. Facility Permit Contact</b>	First Name: Timothy	MI: D	Last Name: Roberts								
	Contact Title: Principal Environmental Engineer										
	Phone: 919-878-2895	Ext.:	Email: tim.roberts@mallinckrodt.com								
<b>2. Facility Permit Contact Mailing Address</b>	Street or P.O. Box: 8801 Capital Boulevard										
	City, Town, or Village: Raleigh										
	State: North Carolina										
	Country: US	Zip Code: 27616									
<b>3. Operator Mailing Address and Telephone Number</b>	Street or P.O. Box: 8801 Capital Boulevard										
	City, Town, or Village: Raleigh										
	State: North Carolina	Phone: 919-878-2800									
	Country: US	Zip Code: 27616									
<b>4. Facility Existence Date</b>	Facility Existence Date (mm/dd/yyyy): 11/16/1966										
<b>5. Other Environmental Permits</b>											
<b>A. Facility Type</b> (Enter code)	<b>B. Permit Number</b>										<b>C. Description</b>
E	0	1	4	7	9	T	5	6			NCDEQ DAQ Title V Air Permit
E	W	Q	0	0	0	5	5	3	7		NCDEQ DWR Residuals Land Application Permit
E	C	H	E	M							City of Raleigh Wastewater Pretreatment Permit
N	N	C	S	0	0	0	1	3	6		NPDES Stormwater Permit
E	P	e	r	m	i	t		#	3	9	US Army COE Wetland Permit (Nationwide)
<b>6. Nature of Business:</b> The facility in Raleigh, NC is a manufacturer of bulk pharmaceutical and other specialty organic chemicals. The major process is the manufacturing of acetaminophen, an active ingredient in many prescription and non-prescription pain relievers and cold and cough preparations.											

EPA ID Number N C D 0 4 2 0 9 1 9 7 5

OMB#: 2050-0024; Expires 01/31/2017

**7. Process Codes and Design Capacities – Enter information in the Section on Form Page 3**

**A. PROCESS CODE** – Enter the code from the list of process codes below that best describes each process to be used at the facility. If more lines are needed, attach a separate sheet of paper with the additional information. For “other” processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in Item 8.

**B. PROCESS DESIGN CAPACITY** – For each code entered in Item 7.A; enter the capacity of the process.

1. **AMOUNT** – Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.

2. **UNIT OF MEASURE** – For each amount entered in Item 7.B(1), enter the code in Item 7.B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.

**C. PROCESS TOTAL NUMBER OF UNITS** – Enter the total number of units for each corresponding process code.

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity	Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
<b>Disposal</b>			<b>Treatment (Continued)</b> (for T81 – T94)		
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day	T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; Liters Per Hour; Kilograms Per Hour; or Million BTU Per Hour
D80	Landfill	Acre-feet; Hectares-meter; Acres; Cubic Meters; Hectares; Cubic Yards	T82	Lime Kiln	
D81	Land Treatment	Acres or Hectares	T83	Aggregate Kiln	
D82	Ocean Disposal	Gallons Per Day or Liters Per Day	T84	Phosphate Kiln	
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards	T85	Coke Oven	
D99	Other Disposal	Any Unit of Measure Listed Below	T86	Blast Furnace	
<b>Storage</b>			T87	Smelting, Melting, or Refining Furnace	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards	T88	Titanium Dioxide Chloride Oxidation Reactor	
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards	T89	Methane Reforming Furnace	
S03	Waste Pile	Cubic Yards or Cubic Meters	T90	Pulping Liquor Recovery Furnace	
S04	Surface Impoundment	Gallons; Liters; Cubic Meters; or Cubic Yards	T91	Combustion Device Used in the Recovery of Sulfur Values from Spent Sulfuric Acid	
S05	Drip Pad	Gallons; Liters; Cubic Meters; Hectares; or Cubic Yards	T92	Halogen Acid Furnaces	
S06	Containment Building Storage	Cubic Yards or Cubic Meters	T93	Other Industrial Furnaces Listed in 40 CFR 260.10	
S99	Other Storage	Any Unit of Measure Listed Below	T94	Containment Building Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTU Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million BTU Per Hour
<b>Treatment</b>			<b>Miscellaneous (Subpart X)</b>		
T01	Tank Treatment	Gallons Per Day; Liters Per Day	X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
T02	Surface Impoundment	Gallons Per Day; Liters Per Day	X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Day; Metric Tons Per Hour; or Million BTU Per Hour
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Metric Tons Per Hour; or Million BTU Per Hour	X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; Gallons Per Day; Liters Per Hour; or Million BTU Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; BTUs Per Hour; Gallons Per Day; Liters Per Hour; or Million BTU Per Hour	X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; or Million BTU Per Hour	X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code
Gallons .....	G	Short Tons Per Hour .....	D	Cubic Yards .....	Y
Gallons Per Hour.....	E	Short Tons Per Day .....	N	Cubic Meters.....	C
Gallons Per Day .....	U	Metric Tons Per Hour .....	W	Acres .....	B
Liters.....	L	Metric Tons Per Day .....	S	Acre-feet .....	A
Liters Per Hour.....	H	Pounds Per Hour.....	J	Hectares.....	Q
Liters Per Day.....	V	Kilograms Per Hour.....	X	Hectare-meter .....	F
		Million BTU Per Hour.....	X	BTU Per Hour.....	I



OMB#: 2050-0024; Expires 01/31/2017

**EXAMPLE FOR COMPLETING Item 7 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.**

**Note: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the line sequentially, taking into account any lines that will be used for "other" process (i.e., D99, S99, T04, and X99) in Item 8.**

## Page 3 of 6

EPA ID Number

N C D 0 4 2 0 9 1 9 7 5

OMB#: 2050-0024; Expires 01/31/2017

**9. Description of Hazardous Wastes - Enter Information in the Sections on Form Page 5**

- A. EPA HAZARDOUS WASTE NUMBER** – Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.
- B. ESTIMATED ANNUAL QUANTITY** – For each listed waste entered in Item 9.A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Item 9.A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.
- C. UNIT OF MEASURE** – For each quantity entered in Item 9.B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

**D. PROCESSES****1. PROCESS CODES:**

**For listed hazardous waste:** For each listed hazardous waste entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all listed hazardous wastes.

**For non-listed waste:** For each characteristic or toxic contaminant entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

**NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:**

- Enter the first two as described above.
  - Enter "000" in the extreme right box of Item 9.D(1).
  - Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 9.E.
- 2. PROCESS DESCRIPTION:** If code is not listed for a process that will be used, describe the process in Item 9.D(2) or in Item 9.E(2).

**NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER** – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

- Select one of the EPA Hazardous Waste Numbers and enter it in Item 9.A. On the same line complete Items 9.B, 9.C, and 9.D by estimating the total annual quantity of the waste and describing all the processes to be used to store, treat, and/or dispose of the waste.
- In Item 9.A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Item 9.D.2 on that line enter "included with above" and make no other entries on that line.
- Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.

**EXAMPLE FOR COMPLETING Item 9** (shown in line numbers X-1, X-2, X-3, and X-4 below) – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number	A. EPA Hazardous Waste No. (Enter code)	B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
				(1) PROCESS CODES (Enter Code)						(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))			
X 1	K 0 5 4	900	P	T	0	3	D	8	0				
X 2	D 0 0 2	400	P	T	0	3	D	8	0				
X 3	D 0 0 1	100	P	T	0	3	D	8	0				
X 4	D 0 0 2												Included With Above

EPA ID Number

N C D 0 4 2 0 9 1 9 7 5

OMB#: 2050-0024; Expires 01/31/2017

9. Description of Hazardous Wastes (Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)															
Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES							
								(1) PROCESS CODES (Enter Code)						(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))	
	1	K	0	8	3	3,330	T	T	8	0	S	0	1		
	2	D	0	2	2	1	T	S	0	1					
	3	F	0	0	2										Included with above
	4	F	0	0	3										Included with above
	5	F	0	0	2	1	T	S	0	1					
	6	F	0	0	3										Included with above
	7	D	0	3	6	1	T	S	0	1					
	8	F	0	0	3										Included with above
	9	D	0	2	2	1	T	S	0	1					
1	0	D	0	3	6										Included with above
1	1	D	0	0	2	5	T	S	0	1					
1	2	D	0	3	6										Included with above
1	3	U	2	2	0	1	T	S	0	1					
1	4	D	0	0	4	1	T	S	0	1					
1	5	D	0	0	8										Included with above
1	6	D	0	3	8										Included with above
1	7	F	0	0	5										Included with above
1	8	D	0	0	1	1	T	S	0	1					
1	9	D	0	0	2										Included with above
2	0	D	0	0	3										Included with above
2	1	D	0	0	4										Included with above
2	2	D	0	0	8										Included with above
2	3	D	0	2	2										Included with above
2	4	D	0	3	6										Included with above
2	5	D	0	3	8										Included with above
2	6	F	0	0	2										Included with above
2	7	F	0	0	3										Included with above
2	8	F	0	0	5										Included with above
2	9	U	0	8	0										Included with above
3	0	U	1	2	2										Included with above
3	1	U	1	6	9										Included with above
3	2	U	2	2	0										Included with above
3	3	D	0	0	9										Included with above
3	4	U	1	7	7	1	P	S	0	1					
3	5	U	0	1	2	10	T	S	0	1					
3	6	U	1	2	2	1	T	S	0	1					

OMB#: 2050-0024; Expires 01/31/2017

Page 5A of 6



EPA ID Number | N | C | D | 0 | 4 | 2 | 0 | 9 | 1 | 9 | 7 | 5 |

OMB#: 2050-0024; Expires 01/31/2017

**10. Map**

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.

**11. Facility Drawing**

All existing facilities must include a scale drawing of the facility (see instructions for more detail).

**12. Photographs**

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, and disposal areas; and sites of future storage, treatment, or disposal areas (see instructions for more detail).

**13. Comments**

This Part A Application is being updated due to a change in ownership from Mallinckrodt LLC to Spec Gx LLC.

The following summarizes reclassifications from accumulated other comprehensive income:

	Amount Reclassified From Accumulated Other Comprehensive Income			Line Item in the Consolidated Statement of Income
	December 29, 2017	September 30, 2016	December 30, 2016	
Amortization of unrealized loss on derivatives	\$ 1.3	\$ 0.7	\$ 0.2	Interest expense
Income tax provision	(0.3)	(0.2)	—	Provision for income taxes
Net of income taxes	1.0	0.5	0.2	
Amortization of pension and post-retirement benefit plans:				
Net actuarial loss	2.7	11.4	1.0 <sup>(1)</sup>	
Prior service credit	(1.9)	(2.7)	(0.6) <sup>(1)</sup>	
Disposal of discontinued operations	(3.1)	0.8	—	
Plan settlements	70.2	8.1	45.0 <sup>(1)</sup>	
Total before tax	67.9	17.6	45.4	
Income tax provision	(27.3)	(6.5)	(16.7)	Provision for income taxes
Net of income taxes	40.6	11.1	28.7	
Currency translation	(4.7)	(59.4)	—	
Total reclassifications for the period	\$ 36.9	\$ (47.8)	\$ 28.9	

(1) These accumulated other comprehensive income components are included in the computation of net periodic benefit cost. See Note 14 for additional details.

## 18. Guarantees

In disposing of assets or businesses, the Company has historically provided representations, warranties and indemnities to cover various risks and liabilities, including unknown damage to the assets, environmental risks involved in the sale of real estate, liability to investigate and remediate environmental contamination at waste disposal sites and manufacturing facilities, and unidentified tax liabilities related to periods prior to disposition. The Company assesses the probability of potential liabilities related to such representations, warranties and indemnities and adjusts potential liabilities as a result of changes in facts and circumstances. The Company believes, given the information currently available, that their ultimate resolution will not have a material adverse effect on its financial condition, results of operations and cash flows.

In connection with the sale of the Specialty Chemical business (formerly known as Mallinckrodt Baker) in fiscal 2010, the Company agreed to indemnify the purchaser with respect to various matters, including certain environmental, health, safety, tax and other matters. The indemnification obligations relating to certain environmental, health and safety matters have a term of 17 years from the sale, while some of the other indemnification obligations have an indefinite term. The amount of the liability relating to all of these indemnification obligations included in other liabilities on the Company's consolidated balance sheets at December 29, 2017 and December 30, 2016 was \$14.9 million and \$15.1 million, of which \$12.1 million and \$12.4 million, respectively, related to environmental, health and safety matters. The value of the environmental, health and safety indemnity was measured based on the probability-weighted present value of the costs expected to be incurred to address environmental, health and safety claims made under the indemnity. The aggregate fair value of these indemnification obligations did not differ significantly from their aggregate carrying value at December 29, 2017 and December 30, 2016. As of December 29, 2017, the maximum future payments the Company could be required to make under these indemnification obligations was \$70.2 million. The Company was required to pay \$30.0 million into an escrow account as collateral to the purchaser, of which \$18.3 million and \$19.0 million remained in other assets on the consolidated balance sheets at December 29, 2017 and December 30, 2016, respectively.

The Company has recorded liabilities for known indemnification obligations included as part of environmental liabilities, which are discussed in Note 19. In addition, the Company is liable for product performance; however the Company believes, given the information currently available, that their ultimate resolution will not have a material adverse effect on its financial condition, results of operations and cash flows.

The Company was required to provide the U.S. Nuclear Regulatory Commission financial assurance demonstrating its ability to fund the decommissioning of its Maryland Heights, Missouri radiopharmaceuticals production facility upon closure. Following the sale of the Nuclear Imaging business, the surety bond was canceled in April 2017 and the Company is no longer required to provide



July 18, 2013

**VIA FEDERAL EXPRESS**

Bryan A. Parker, Health Physicist  
Materials Licensing Branch  
Division of Nuclear Materials Safety  
United States Nuclear Regulatory Commission  
Region III  
2443 Warrensville Road, Suite 210  
Lisle, Illinois 60532-4352

**SUBJECT: REQUEST FOR CONSENT TO INDIRECT LICENSE TRANSFER**

Dear Mr. Parker:

This letter is sent with respect to your letter of June 17, 2013, to Patricia Duft, in which the U.S. Nuclear Regulatory Commission (NRC) provided its consent to the proposed indirect transfer of control regarding NRC Materials Licenses issued to Mallinckrodt LLC.

Mallinckrodt had previously indicated that it would provide the identities of the Board of Directors for Mallinckrodt LLC's ultimate, publicly-traded, parent corporation – Mallinckrodt plc. Enclosed herewith is a list of those individuals. In a second enclosure you will find the list and appointment of corporate officers of Mallinckrodt LLC.

If you have any questions or need further information, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script that reads 'Eric Berry'.

Eric Berry  
Vice President, Environmental Law  
T. 314.654.6878 | F. 314.654.3156  
[eric.berry@mallinckrodt.com](mailto:eric.berry@mallinckrodt.com)

JEB:blj

cc: John Buckley - NRC  
Jim Schuh - Mallinckrodt

Enclosures

**RECEIVED JUL 19 2013**



Contact News & Media Select a Region Keywords...  
COMPANY PRODUCTS RESPONSIBILITY INVESTORS CAREERS

Home Investors

Investor Relations  
Board of Directors  
Calendar of Events  
Corporate Governance  
Investor Contact  
Information Request  
News Releases  
Presentations  
Product Pipeline  
SEC Filings

## BOARD OF DIRECTORS

### Melvin D. Booth, Chairman of the Board

Mr. Booth has been a director of Catalent Pharma Solutions since 2010, a director of PRA International since 2004 and a director of eResearch Technologies since 2012. Mr. Booth has also been a strategic advisor in life sciences to Genstar Capital (a private equity firm) since 2005. Mr. Booth's previous public company board experience includes serving as Lead Director of Millipore, a life science research company, from 2004 to 2010, and as a member of the boards of MedImmune from 1998 to 2005 and of Human Genome Sciences from 1995 to 1998. Mr. Booth was President of MedImmune from 1998 until his retirement at the end of 2003. Mr. Booth was President of Human Genome Sciences from 1995 to 1998. He held a variety of domestic and international positions with Syntex from 1981 to 1995, including serving as President of its U.S. pharmaceuticals business. Mr. Booth has been active in U.S. pharmaceutical industry organizations and is a past Chairman of the Pharmaceuticals Manufacturers Association of Canada. Mr. Booth received a B.S. degree in accounting from Northwest Missouri State University where he was also awarded an honorary Doctor of Science degree. He is also a Certified Public Accountant. Mr. Booth's qualifications to serve on our board include his significant experience in leadership positions at pharmaceutical companies.

### David R. Carlucci, Director

Mr. Carlucci was President and Chief Operating Officer of IMS Health from October 2002 until January 2005, when he was named Chief Executive Officer and President. He became Chairman and Chief Executive Officer the following year. Mr. Carlucci retired from IMS Health in December 2010. Mr. Carlucci held several senior executive level positions at IBM from 1976 to 2002, including operations and management positions in the U.S., Canada, Latin America and Asia Pacific. Mr. Carlucci has been a director and Chairman of the Human Resources and Compensation Committee for MasterCard International since 2006. Mr. Carlucci also served as a member of the advisory board of Mitsui USA, one of the world's most diversified comprehensive trading, investment and service companies. Mr. Carlucci received a B.A. in political science from the University of Rochester. Mr. Carlucci's qualifications to serve on our board include his significant experience as an executive and/or board member of publicly traded and private companies.

### J. Martin Carroll, Director

Mr. Carroll served as President and Chief Executive Officer of Boehringer Ingelheim Corporation and of Boehringer Pharmaceuticals, Inc. from 2003 until 2012. Mr. Carroll currently serves as the head of corporate strategy and development for Boehringer Ingelheim's U.S. operations and remains a director of Boehringer Ingelheim Corporation. Mr. Carroll joined the organization in 2002 as President of Boehringer Pharmaceuticals, Inc. Mr. Carroll worked at Merck & Company, Inc. from 1976 to 2001. From 1972 to 1976, Mr. Carroll served in the United States Air Force where he attained the rank of Captain. Mr. Carroll also serves as a director of Vivus, Inc. Mr. Carroll received a B.A. in accounting & economics from the College of the Holy Cross and a M.B.A. from Babson College. Mr. Carroll's qualifications to serve on our board include his significant experience in leadership positions at pharmaceutical companies.

### Diane H. Gulyas, Director

Ms. Gulyas has worked at E. I. du Pont de Nemours and Company since 1978 and has been the President of DuPont's Performance Polymers division since 2009. She is also the Vice Chairman of the DuPont-Teijin Films global joint venture. From 2009 until 2012, Ms. Gulyas served as a director and as a member of the Finance Committee of Navistar International Corporation, a leading manufacturer of commercial trucks, buses, RVs, defense vehicles and engines. Ms. Gulyas received her B.S. in chemical engineering from the University of Notre Dame. Ms. Gulyas' qualifications to serve on our board include her extensive executive experience with chemical and manufacturing companies.

### Nancy S. Lurker, Director

Ms. Lurker has been serving as a director and Chief Executive Officer of PDI Inc. since 2008. Prior to joining PDI, Ms. Lurker served as Senior Vice President and Chief Marketing Officer of Novartis Pharmaceuticals Corporation from 2006 to 2008. Prior to that, she was President and Chief Executive Officer of ImpactRx, Inc. from 2003 to 2006. From 1998 to 2003, Ms. Lurker served as Group Vice President - Global Primary Care Products for Pharmacia Corporation. She was also a member of Pharmacia's U.S. Executive Management Committee from 1998 to 2003. Ms. Lurker began her career at Bristol-Myers Squibb, where she worked for 14 years. Ms. Lurker also has served as a director of Auxilium Corporation since 2011. Ms. Lurker served as a director of ConjuChem Biotechnologies, Inc. from 2004 to 2006 and as a director of Elan Corporation from 2005 to 2006. Ms. Lurker received a B.S. magna cum laude in biology from Seattle Pacific University and a M.B.A. from the University of Evansville. Ms. Lurker's qualifications to serve on our board include her significant experience in leadership positions at pharmaceutical companies.

### JoAnn A. Reed, Director

Ms. Reed is a healthcare services consultant. Ms. Reed served as an advisor to the Chief Executive Officer of Medco Health Solutions from April 2008 to April 2009. From 2002 to March 2008, Ms. Reed served as Senior Vice President, Finance and Chief Financial Officer of Medco Health Solutions. From 1992 to 2002, she served as Senior Vice President, Finance of Medco Health Solutions. She joined Medco Containment Services, Inc. in 1988. Ms. Reed has been a director of American Tower Corporation since 2007, a director of Waters Corporation since 2006 and a trustee of St. Mary's College of Notre Dame since 2006. Ms. Reed received a B.B.A. in business administration from St. Mary's College. She received her M.B.A. in finance and international marketing cum laude from Fordham University. Ms. Reed's qualifications to serve on our board include her experience as a healthcare services consultant and her financial expertise experience



and knowledge of financial statements, corporate finance and accounting matters.

**Kneeland C. Youngblood, M.D., Director**

Dr. Youngblood is a founding partner of Pharos Capital Group, a private equity firm that focuses on providing growth and expansion capital/buyouts in healthcare, business services and opportunistic investments. Dr. Youngblood served as a director of iStar Financial from 1998 to 2001, a director of Starwood Hotels and Resorts from 2001 to 2012, a director of Burger King Corporation from 2004 to 2010 and a director of the Gap Inc. from 2006 to 2012. Dr. Youngblood has been serving as a director of Energy Future Holdings Corp, an electric utility provider, since 2007. Dr. Youngblood is a physician by training, with over 15 years of experience in emergency medicine. He is also a member of the Council on Foreign Relations. Dr. Youngblood earned a B.A. in politics from Princeton University and an M.D. from the University of Texas Southwestern Medical School. Dr. Youngblood's qualifications to serve on our board include his extensive experience in healthcare practice, policy and business.

**Joseph A. Zaccagnino, Director**

Mr. Zaccagnino, who has been a director of Covidien since its spin-off from Tyco International in 2007, serves on its Compliance and Transactions Committees and as Chairman of the Nominating and Governance Committee. Mr. Zaccagnino served as President, Chief Executive Officer and director of Yale New Haven Health System and its flagship Yale-New Haven Hospital from 1991 until his retirement in 2005. He also served as a director of NewAlliance Bancshares, Inc. from 1991 until it was acquired in 2010. Mr. Zaccagnino served on the board of the National Committee for Quality Healthcare from 1995 until 2005, and was elected Chairman of the Board in 2003. From 1999 until 2006 he served as a director and from 2004 to 2006 as Chairman of the Board of VHA Inc., a provider member cooperative of community owned health systems and their physicians which provides supply chain and group purchasing services through their subsidiaries, Novation and Provista. Mr. Zaccagnino received a B.S. (business administration) from the University of Connecticut and a M.P.H. (healthcare management) from Yale University School of Medicine. Mr. Zaccagnino's qualifications to serve on our board include his broad healthcare management and governance experience, his knowledge of healthcare policy and regulation, patient care delivery and financing, and of clinical research and medical technology assessment, all of which will provide our board with unique insights and a keen perspective on the complexities of the healthcare sector and on the priorities of and challenges facing our company and the purchasers of our products.

[Privacy Policy](#) [Terms of Use](#) [Patents](#) [Suppliers](#)

Mallinckrodt, the 'M' brand mark, the Mallinckrodt Pharmaceuticals logo and other brands are trademarks of a Mallinckrodt company. © 2013 Mallinckrodt.  
Mallinckrodt Pharmaceuticals is a registered business name of Mallinckrodt plc, which is registered in Ireland as a public limited company with registration number 522227 and has its registered office at Darnestown, Mulhuddart, Dublin 15, Ireland.

**RESOLVED:** That the President and any Vice President of the Company be, and each of them hereby is, acting singly or jointly, authorized to represent, and vote on behalf of, the Company, as shareholder, at any shareholder meetings of the Company's subsidiaries and perform any and all other acts necessarily ancillary thereto, to execute any written consents on behalf of the Company in lieu of such shareholder meetings and to grant proxies or powers of attorney as they may deem necessary or desirable to represent the Company at such shareholder meetings and to sign documents and perform other acts necessarily ancillary thereto; and

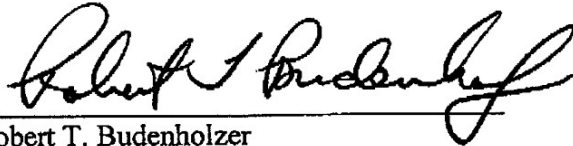
**RESOLVED:** That all actions, including the execution and delivery of proxies and powers of attorney, heretofore or hereafter taken by the officers of the Company in furtherance of the actions contemplated by the foregoing resolutions are hereby approved, adopted and ratified; and

**RESOLVED:** That at any time after any officer elected herein shall cease to be an employee of Mallinckrodt plc or one of its subsidiaries (a "Mallinckrodt Entity"), then such officer shall be deemed to have been removed by this Board of Managers from his or her office as described herein without the necessity of any written resignation from such officer or any further action by the Board of Managers and that such officer shall be relieved of all rights, responsibilities and duties relating to his or her office, as applicable, effective, unless such officer otherwise resigns on an earlier date, as of the date such officer ceases to be an employee of a Mallinckrodt Entity; and

**RESOLVED:** That this consent be filed with the records of the meetings of the Board of Managers of the Company and that the action taken hereby be treated for all purposes as action taken by vote of the Board of Managers of the Company at a meeting of the Board of Managers held for that purpose.

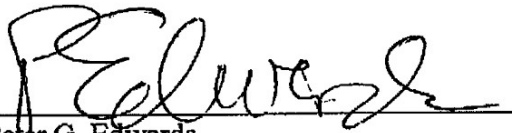
*(remainder of page intentionally left blank)*

IN WITNESS WHEREOF, each of the undersigned has executed this consent, which may be signed in one or more counterparts, which taken together shall constitute one and the same consent as of the date last written below.



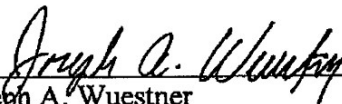
Robert T. Budenholzer  
Manager

June 27, 2013  
Date



Peter G. Edwards  
Manager

6-28-13  
Date



Joseph A. Wuestner  
Manager

6-28-13  
Date



**EXHIBIT A****BANK RESOLUTION**

**RESOLVED**, that the Vice President & Treasurer and any Assistant Treasurers of the Company and the Senior Treasury Manager, Cash Management and any designee authorized by either of them, in his or her sole discretion (such Officers, together with their designees, as may be changed from time to time, the "Authorized Officers") be, and each of them is, authorized and directed, from time to time, to designate one or more banks as either of them may from time to time deem appropriate (the "Banks") as a depository or depositories of the funds of the Company, and the Authorized Officers be, and each of them hereby is, authorized and directed to open and close bank accounts with the Banks, deposit with the Banks any and all checks, drafts, notes, bills of exchange and orders for the payment of money belonging to or coming into the possession of the Company, execute fund transfers, add or delete banking services with the Banks, approve overdraft facilities with the Banks, execute short-term cash investments within the guidelines of corporate treasury's cash investment policy, and approve and/or execute any and all documents necessary to carry out the foregoing activities, including any service or banking agreements with the Banks. Endorsement for deposit may be written or stamped endorsement of the Company without designation of the person making the endorsement;

**FURTHER RESOLVED**, that the Authorized Officers be, and they hereby are, authorized and directed:

(a) to sign any and all checks, drafts, bills of exchange and orders, including orders or directions in letter or informal form, against any funds at any time standing to the credit of the Company in the Banks and/or against any account of the Company with the Banks;

(b) to designate such other person or persons as they shall deem necessary who are authorized to sign any and all checks, drafts and orders, including orders or directions in informal or letter form, against any funds at any time standing to the credit of the Company with the Banks, which names may be changed from time to time;

**FURTHER RESOLVED**, that the Banks hereby are authorized to honor and pay any and all checks, drafts and orders, including orders or directions in informal or letter form, signed in accordance with the authority of the foregoing resolution and charge the same against any funds at any time standing to the credit of the Company with the Banks;

**FURTHER RESOLVED**, that the Secretary, or, in his or her absence, any Assistant Secretary, of the Company hereby is authorized to certify to the Banks a copy of these resolutions, and the Banks hereby are authorized to act upon such certification until formally advised by like certificate of any changes therein;

**FURTHER RESOLVED**, that in connection with the foregoing, the Board of Managers hereby adopts and makes a part of these resolutions, as if fully recited herein, any

prescribed forms of resolutions or consents as may be required or specified by any Bank in connection with the designation of such Bank as a depository of funds of the Company;

**FURTHER RESOLVED**, that the Authorized Officers hereby are authorized and directed to take or cause to be taken such further actions as in their judgment are necessary or appropriate to carry out the purpose and intent of the foregoing resolutions;

**FURTHER RESOLVED**, that all actions, including execution and delivery of documents, heretofore or hereafter taken by the officers or agents of the Company in furtherance of the actions contemplated by the foregoing resolutions are hereby approved, adopted and ratified; and

**FURTHER RESOLVED**, that the foregoing resolutions shall supersede any and all resolutions previously adopted for the same purpose and that any and all such previously adopted resolutions are hereby rescinded.

**MALLINCKRODT LLC**  
**Consent in Lieu of Annual Meeting of the Board of Managers**

The undersigned, being all of the members of the **Board of Managers of Mallinckrodt LLC**, a Delaware limited liability company (the "Company"), in accordance with the Delaware Limited Liability Company Act, hereby consent to the following action and agree that such action shall have the same effect as if duly taken at a meeting of the Board of Managers held for the purpose:

WHEREAS, at meetings of the Board of Directors of Mallinckrodt plc ("Mallinckrodt") and of Covidien plc ("Covidien"), the respective Boards discussed and approved a separation of the pharmaceuticals business of Covidien (the "Business") from the rest of Covidien by means of the declaration of a dividend in specie of the Business, to be effected by the transfer of the Business from Covidien to Mallinckrodt and the issuance by Mallinckrodt of ordinary shares in its share capital, par value \$0.20 per share, credited as fully paid directly to Covidien's shareholders (the "Transaction");

WHEREAS, the Transaction shall be effective at 6:59 p.m., New York City time (the "Effective Time") on the date on which the Transaction is effected.

**RESOLVED:** That effective as of the Effective Time, all of the present officers of the Company be, and they hereby are, removed as officers of the Company; and

**RESOLVED:** That the following persons be, and they hereby are, elected to serve as officers of the Company, effective as of the date hereof to hold office until their successors are duly elected and qualified:

<u>Name</u>	<u>Office</u>
Kathleen A. Schaefer	President
Marvin Haselhorst	Vice President
John E. Einwalter	Vice President & Treasurer
Miriam R. Singer	Vice President & Secretary
C. Stephen Kriegh	Vice President & Assistant Secretary
Eric Berry	Vice President & Assistant Secretary
Joseph A. Wuestner	Vice President & Assistant Secretary
Robert T. Budenholzer	Vice President & Assistant Secretary
Mairi Lough	Vice President & Assistant Secretary
Lamar Agard	Vice President & Assistant Treasurer
Matthew Mainer	Vice President & Assistant Treasurer
Stephanie Kardasz	Assistant Secretary
Stephanie Re	Assistant Secretary
Stephen A. Welch	Assistant Secretary
Kenneth D. Goetz	Assistant Secretary



- RESOLVED:** That, if the Company ceases to do business in any jurisdiction in which it is qualified, and, in the discretion of the officers of the Company it is deemed necessary or appropriate for the Company to withdraw from such jurisdiction(s), the appropriate officers of the Company are hereby authorized and directed to take such action as is necessary to withdraw from said jurisdiction(s), including, revoking any appointment of agent or attorney for service of process and/or filing such certificates, reports, revocation of appointment or surrender of authority of the Company to do business in any such jurisdiction; and
- RESOLVED:** That the President or any Vice President be authorized and empowered to change the primary place of business of the Company, as he/she feels necessary, to execute and deliver the documentation pursuant to such change, and to take such steps required or advisable to carry this out; and
- RESOLVED:** That any form of resolution required to be adopted and filed in connection with any of the foregoing acts in any jurisdiction, be attached to this unanimous consent and such resolution is hereby adopted with the same force and effect as if set forth in full herein; and
- RESOLVED:** That, the Vice President & Treasurer and any Assistant Treasurers of the Company and the Senior Treasury Manager, Cash Management and each of them hereby is, acting singly or jointly, authorized and empowered to cause one or more accounts to be opened, maintained and closed from time to time in the name of the Company at banks that they deem appropriate, pursuant to the resolutions attached hereto as Exhibit A, and the Company may use such account or accounts to transact such business with such banks as is customary for business corporations to transact with such banks; and
- RESOLVED:** That the Company is hereby authorized to enter into debt and equity agreements, including loan agreements, deposit agreements, cash management agreements, assignment agreements, contribution agreements, capital subscription agreements and share purchase agreements, solely with other direct and indirect subsidiaries of Mallinckrodt plc with such terms as the officers of the Company determine to be acceptable (the "Intercompany Financing Agreements"); provided that the Intercompany Financing Agreements have been duly approved pursuant to the duly adopted delegation of authority of Mallinckrodt plc; and
- RESOLVED:** That the officers of the Company be, and each of them hereby is, acting singly or jointly, authorized to execute in the name and on behalf of the Company, and to deliver when so executed, the Intercompany Financing Agreements, and any other documents or instruments that are necessary to accomplish the purpose of the foregoing resolution, and to do all such other acts and things as they deem necessary or appropriate to carry out fully the intent and purposes of the foregoing resolution and the execution thereof; and

# FedEx

Express

From: (314) 654-3462  
BARBARA L JOHNSON  
Tyco Mallinckrodt  
675 McDonnell Blvd  
Hazelwood, MO 63042

Origin ID: ALNA

FedEx



Ship Date: 18JUL13  
ActWgt: 0.5 LB  
CAD: 3742287/INET3370

Delivery Address Bar Code



SHIP TO: (630) 828-9500

BILL SENDER

Bryan A. Parker  
US Nuclear Regulatory Commission  
Materials Licensing Branch, Reg.III  
2443 Warrensville Rd., Suite 210  
LISLE, IL 60532

Ref # 0080114208777-6656  
Invoice #  
PO #  
Dept #

RECEIVED JUL 19 2013

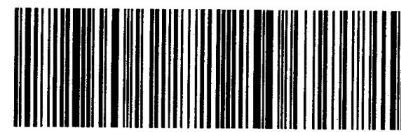
FRI - 19 JUL 3:00P  
STANDARD OVERNIGHT

TRK# 7962 6568 4111  
0201



XH ENLA

60532  
IL-US  
ORD



The Work Done On Time.

RT 493  
FZ 495

# Envelope

Align bottom of Peel and Stick Airbill here.

**PATENT ASSIGNMENT COVER SHEET**

PAGE # 34

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT4733369

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT	
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT	
<b>CONVEYING PARTY DATA</b>		
<b>Name</b>		<b>Execution Date</b>
MALLINCKRODT LLC		12/13/2017
<b>RECEIVING PARTY DATA</b>		
<b>Name:</b>	SPECGX LLC	
<b>Street Address:</b>	385 MARSHALL AVENUE	
<b>City:</b>	WEBSTER GROVES	
<b>State/Country:</b>	MISSOURI	
<b>Postal Code:</b>	63119	
<b>PROPERTY NUMBERS Total: 127</b>		
<b>Property Type</b>	<b>Number</b>	
Patent Number:	6102198	
Patent Number:	5912347	
Patent Number:	6308826	
Patent Number:	6343458	
Patent Number:	6579985	
Patent Number:	7285665	
Patent Number:	7385068	
Patent Number:	7691880	
Patent Number:	7456306	
Patent Number:	7834184	
Patent Number:	7511060	
Patent Number:	7622586	
Patent Number:	8658433	
Patent Number:	8871779	
Patent Number:	8067597	
Patent Number:	8993764	
Patent Number:	8022181	
Patent Number:	7714063	
Patent Number:	7671204	
Patent Number:	8017777	

**PATENT**

504686647

**REEL: 044891 FRAME: 0376**

Property Type	Number
Patent Number:	8252808
Patent Number:	8461337
Patent Number:	8067596
Patent Number:	8101757
Patent Number:	7999105
Patent Number:	8115002
Patent Number:	7985858
Patent Number:	8148528
Patent Number:	8445682
Patent Number:	8461384
Patent Number:	8232400
Patent Number:	8242277
Patent Number:	8227611
Patent Number:	8168790
Patent Number:	9458109
Patent Number:	9040726
Patent Number:	8252928
Patent Number:	8217175
Patent Number:	8232398
Patent Number:	8273887
Patent Number:	8394814
Patent Number:	8269006
Patent Number:	8080661
Patent Number:	8163912
Patent Number:	8293906
Patent Number:	8232396
Patent Number:	8227608
Patent Number:	8232397
Patent Number:	8309727
Patent Number:	8399475
Patent Number:	8273888
Patent Number:	8524904
Patent Number:	8283472
Patent Number:	8383649
Patent Number:	8729266
Patent Number:	8431701
Patent Number:	8563727
Patent Number:	8436174

Property Type	Number
Patent Number:	8563724
Patent Number:	8293907
Patent Number:	9040705
Patent Number:	8742028
Patent Number:	8519133
Patent Number:	8471023
Patent Number:	8492547
Patent Number:	8623888
Patent Number:	8314237
Patent Number:	8399671
Patent Number:	8383815
Patent Number:	8431705
Patent Number:	8415474
Patent Number:	8669366
Patent Number:	8490795
Patent Number:	8925727
Patent Number:	8910456
Patent Number:	9046403
Patent Number:	8842501
Patent Number:	8563725
Patent Number:	9016516
Patent Number:	8342331
Patent Number:	8703949
Patent Number:	8624030
Patent Number:	8991606
Patent Number:	8946433
Patent Number:	8731655
Patent Number:	9086349
Patent Number:	8748611
Patent Number:	8829020
Patent Number:	8614224
Patent Number:	9296699
Patent Number:	8624031
Patent Number:	8627957
Patent Number:	8921561
Patent Number:	9012468
Patent Number:	9005098
Patent Number:	8946419



Property Type	Number
Patent Number:	9120607
Patent Number:	9301918
Patent Number:	9518062
Patent Number:	9527858
Patent Number:	9414989
Patent Number:	9339565
Patent Number:	9181237
Patent Number:	9499556
Patent Number:	9193737
Patent Number:	9127009
Patent Number:	9415044
Patent Number:	9579252
Patent Number:	9593111
Patent Number:	9556108
Patent Number:	9713592
Patent Number:	9730885
Application Number:	15235312
Application Number:	12299944
Application Number:	14336357
Application Number:	13865244
Application Number:	13865286
Application Number:	15714137
Application Number:	15420386
Application Number:	15164483
Application Number:	14192971
Application Number:	15568587
Application Number:	14722541
Application Number:	14788908
Application Number:	15202670
Application Number:	15417541
Application Number:	15464865

**CORRESPONDENCE DATA**

Fax Number: (847)808-5500

*Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.*

Phone: 8478085500

Email: mail@iphorgan.net

Correspondent Name: CARLYNN DAVIS

Address Line 1: 195 ARLINGTON HEIGHTS RD.

**PATENT**

**REEL: 044891 FRAME: 0379**

**Address Line 2:** SUITE #125  
**Address Line 4:** BUFFALO GROVE, ILLINOIS 60089

PAGE # 38

<b>ATTORNEY DOCKET NUMBER:</b>	MAL 2257 US
<b>NAME OF SUBMITTER:</b>	CARLYNN DAVIS
<b>SIGNATURE:</b>	/Carlynn Davis/
<b>DATE SIGNED:</b>	12/13/2017

**Total Attachments: 9**

source=Assignment 20171213#page1.tif  
source=Assignment 20171213#page2.tif  
source=Assignment 20171213#page3.tif  
source=Assignment 20171213#page4.tif  
source=Assignment 20171213#page5.tif  
source=Assignment 20171213#page6.tif  
source=Assignment 20171213#page7.tif  
source=Assignment 20171213#page8.tif  
source=Assignment 20171213#page9.tif

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

WHEREAS, Mallinckrodt LLC, a Delaware limited liability company located at 675 McDonnell Boulevard, Hazelwood, MO 63042 ("ASSIGNOR"), is the owner of the entire right, title and interest in and to the patents and patent applications described in Exhibit A attached hereto and the corresponding inventions as described and claimed therein (collectively "Patent Properties"); and

WHEREAS, SpecGx LLC, a Delaware limited liability company, a Delaware limited liability company located at 385 Marshall Avenue, Webster Groves, MO 63119 ("ASSIGNEE"), is desirous of acquiring the entire right, title and interest in and to the Patent Properties and in and to any letters patent that may be granted therefor in the United States and in any and all foreign countries.

WHEREAS it is desired that the assignment of the Patent Properties be made of record in the United States Patent and Trademark Office

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, ASSIGNOR hereby sells, assigns and transfers unto said ASSIGNEE, its entire worldwide right, title and interest in and to the Patent Properties, and to any and all letters patent which may be granted as a result thereof in the United States of America, in the territorial possessions of the United States of America and in any and all foreign countries, and to any and all divisions, reissues and continuations thereof, including the right to sue and recover damages for past infringement, the right to file foreign applications directly in the name of ASSIGNEE, the right to claim priority rights deriving from the Patent Properties to which said foreign applications are entitled by virtue of international convention, treaty or otherwise, said inventions and all letters patent on said inventions to be held and enjoyed by ASSIGNEE and its successors and assigns as fully and entirely as the same would have been held and enjoyed by ASSIGNOR had this sale, assignment and transfer not been made.

Executed the 13<sup>th</sup> day of December, 2017 (date of execution)

**Mallinckrodt LLC**

By: Carlynn Davis

Name: Carlynn Ferguson Davis

Title: Attorney-in-fact

**SpecGx LLC**

By: Carlynn Davis

Name: Carlynn Ferguson Davis

Title: Attorney-in-fact

**EXHIBIT A**

Country	Invention Title	Appl. No.	Filing Date	Patent No.	Issue Date	Status
US	Bulk Packaging System & Method for Retarding Caking of Organic & Inorganic Chemical Compounds	08/862010	5/22/1997	6102198	8/15/2000	Granted
US	PROCESS FOR PREPARING A MORPHINAN DERIVATIVE	08/939245	9/29/1997	5912347	6/15/1999	Granted
US	Bulk Packaging System & Method for Retarding Caking of Organic & Inorganic Chemical Compounds	09/296164	6/2/1999	6308826	10/30/2001	Granted
US	Bulk Packaging System & Method for Retarding Caking of Organic & Inorganic Chemical Compounds	09/560043	4/27/2000	6343458	2/5/2002	Granted
US	PREPARATION OF CODEINE FROM MORPHINE	10/274702	10/21/2002	6579985	6/17/2003	Granted
US	PROCESS FOR THE PREPARATION OF QUATERNARY N-ALKYL MORPHINAN ALKALOID SALTS	10/530446	4/5/2005	7285665	10/23/2007	Granted
US	Improved Stearate Composition and Method	11/154849	6/16/2005	7385068	6/10/2008	Granted
US	Methylphenidate HCl Oral Solution	10/554133	10/20/2005	7691880	4/6/2010	Granted
US	Improved Stearate Composition and Method	10/558591	11/29/2005	7456306	11/25/2008	Granted
US	Synthesis of 1-[(6-chloro-3,4-dihydroxy-phenyl)methyl]-3,4,5,6,7,8-hexahydro-6-oxo-2(1H)-isoquinolinecarboxaldehyde (CI-OH-12) and its analogues	11/718263	4/30/2007	7834184	11/16/2010	Granted
US	Synthesis of 1-[(6-chloro-3,4-dihydroxy-phenyl)methyl]-3,4,5,6,7,8-hexahydro-6-oxo-2(1H)-isoquinolinecarboxaldehyde (CI-OH-12) and its analogues	11/741910	4/30/2007	7511060	3/31/2009	Granted
US	Synthesis of 1-[(6-chloro-3,4-dihydroxy-phenyl)methyl]-3,4,5,6,7,8-hexahydro-6-oxo-2(1H)-isoquinolinecarboxaldehyde (CI-OH-12) and its analogues	11/741932	4/30/2007	7622586	11/24/2009	Granted
US	DYE-AZIDE COMPOSITIONS FOR DUAL PHOTOTHERAPY	11/931683	10/31/2007	8658433	2/25/2014	Granted
US	A CONVENIENT AND EFFECTIVE WAY TO CONVERT (MINOR AMOUNT OF) ALPHA,BETA-UNSATURATED KETONE TO SATURATED KETONE IN THE FINISHING DRUG SUBSTANCE	11/915606	11/27/2007	8871779	10/28/2014	Granted
US	A NEW SYNTHETIC ROUTE TO 14-HYDROXYL OPIATES THROUGH 1-HALO-THEBAINE OR ANALOGS	11/917180	12/11/2007	8067597	11/29/2011	Granted
US	THE USE OF ORIPAVINE AS A STARTING MATERIAL FOR BUPRENORPHINE	12/159025	6/24/2008	8993764	3/31/2015	Granted

US	A NEW CLEAVAGE REAGENT FOR THE RELEASE OF FULLY PROTECTED PEPTIDES SYNTHESIZED ON 2-CHLOROTRITYL CHLORIDE RESIN	12/298917	10/29/2008	8022181	9/20/2011	Granted
US	DEVELOPMENT OF A NEW SOLID SUPPORT AND ITS USE FOR THE NOVEL AND EFFICIENT SYNTHESIS OF PEPTIDES BY FMOC METHOD	12/264948	11/5/2008	7714063	5/11/2010	Granted
US	N-DEMETHYLATION OF ORIPAVINE AND THEBAINE	12/316821	12/17/2008	7671204	3/2/2010	Granted
US	A NEW SYNTHETIC ROUTE ON MAKING (+)-BUPRENORPHINE FROM (+)-NORHYDROMORPHONE	12/316861	12/17/2008	8017777	9/13/2011	Granted
US	PRODUCTION OF THE UNNATURAL OPIATES FROM SINOMENINE	12/316862	12/17/2008	8252808	8/28/2012	Granted
US	SYNTHESIS OF THE POTENTIALLY BIOLOGICALLY ACTIVE ALKALOIDS DERIVED FROM SINOMENINE	12/316846	12/17/2008	8461337	6/11/2013	Granted
US	A NEW SYNTHETIC ROUTE ON MAKING (+)-NALTREXONE FROM 7-METHOXYHYDROCODONE	12/316974	12/17/2008	8067596	11/29/2011	Granted
US	PRODUCTION OF PURE NOROXYMORPHONE SALTS FROM CRUDE OXYMORPHONE WITHOUT THE ISOLATION OF ANY INTERMEDIATE COMPOUNDS	12/316887	12/17/2008	8101757	1/24/2012	Granted
US	O-DEMETHYLATION OF 3-METHOXYMORPHINAN DERIVATIVES TO 3-HYDROXYMORPHINAN DERIVATIVES, INCLUDING O-DEMETHYLATION OF OXYCODONE TO FORM OXYMORPHONE	12/372788	2/18/2009	7999105	8/16/2011	Granted
US	IMPROVEMENTS IN THE PREPARATION OF KEY INTERMEDIATES IN THE TOTAL SYNTHESIS OF OPIATES	12/441397	3/16/2009	8115002	2/14/2012	Granted
US	IMPROVED PROCESS FOR THE PREPARATION OF 6ALPHA-HYDROXY-N-ALKYLATED OPTIATES IN ONE POT	12/444421	4/6/2009	7985858	7/26/2011	Granted
US	NEW TOTAL SYNTHETIC ROUTE TO NOROXYMORPHONE AND DERIVATIVES	12/469951	5/21/2009	8148528	4/3/2012	Granted
US	IMPROVED PROCESS FOR THE PREPARATION OF 3,4-DIHYDROISOQUINOLINES	12/518434	6/10/2009	8445682	5/21/2013	Granted
US	IMPROVED PROCESS FOR THE PREPARATION OF 3,4-DIHYDROISOQUINOLINES	12/481993	6/10/2009	8461384	6/11/2013	Granted
US	IMPROVED PROCESS FOR THE PREPARATION OF 3,4-DIHYDROISOQUINOLINES	12/482014	6/10/2009	8232400	7/31/2012	Granted



US	IMPROVED PROCESS FOR THE PREPARATION OF 5-[1,2,3,4,5,8-HEXAHYDRO-6-METHOXY-1-ISOQUINOLINYL]METHYL]-2-METHOXY-PHENOL	12/518430	6/10/2009	8242277	8/14/2012	Granted
US	IMPROVED PROCESS FOR THE PREPARATION OF 5-[1,2,3,4,5,8-HEXAHYDRO-6-METHOXY-1-ISOQUINOLINYL]METHYL]-2-METHOXY-PHENOL	12/482036	6/10/2009	8227611	7/24/2012	Granted
US	PROCESS FOR REDUCTION OF 6-KETO-OPIATES AND-MORPHANANS TO THE CORRESPONDING 6-BETA-HYDROXY-EPIMERS	12/485200	6/16/2009	8168790	5/1/2012	Granted
US	SYNTHESIS OF SUBSTITUTED BERBINES	12/552457	9/2/2009	9458109	10/4/2016	Granted
US	PROCESS IMPROVEMENT FOR THE SYNTHESIS NALTREXONE METHOBROMIDE	12/553144	9/3/2009	9040726	5/26/2015	Granted
US	NEW METHODOLOGY FOR THE FORMATION OF 5 AND 6 MEMBERED RINGS	12/558646	9/14/2009	8252928	8/28/2012	Granted
US	IMPROVED PREPARATION OF OXYMORPHONE FROM ORIPAVINE	12/532410	9/22/2009	8217175	7/10/2012	Granted
US	BUPRENORPHINE STEP 3 YIELD INCREASED BY RECYCLING ALKALOIDS IN THE FILTRATE FROM A PREVIOUS BATCH	12/586856	9/29/2009	8232398	7/31/2012	Granted
US	IMPROVED HYDROGENATION PROCESS FOR SYNTHETIC PREPARATION OF BUPRENORPHINE	12/586874	9/29/2009	8273887	9/25/2012	Granted
US	PURIFICATION OF CRUDE NOSCAPINE	12/586850	9/29/2009	8394814	3/12/2013	Granted
US	PROCESS FOR REDUCTIVE AMINATION OF KETONORMORPHINANS BY CATALYTIC HYDROGEN TRANSFER	12/586844	9/29/2009	8269006	9/18/2012	Granted
US	AN EFFICIENT AND OPERATIONALLY CONVENIENT SYNTHESIS OF TERTIARY AMINES BY DIRECT N-ALKYLATION OF SECONDARY AMINES OF ALKALOIDS WITH ALKYL HALIDES	12/586843	9/29/2009	8080661	12/20/2011	Granted
US	PREPARATION OF BERBERINES	12/586834	9/29/2009	8163912	4/24/2012	Granted
US	AN IMPROVED SYNTHESIS OF BUPRENORPHINE	12/586854	9/29/2009	8293906	10/23/2012	Granted
US	AN IMPROVED METHOD FOR CONTROL OF THE BETA-EPIMER IMPURITY FORMED IN THE DIELS ALDER REACTION OF THEBAINE OR ORIPAVINE WITH METYL VINYL KETONE	12/586841	9/29/2009	8232396	7/31/2012	Granted
US	3-O-METHYL NORBUPRENORPHINE AS STARTING MATERIAL TO PRODUCE NORBUPRENORPHINE	12/586842	9/29/2009	8227608	7/24/2012	Granted
US	IMPROVED THEBAINE TO BUPRENORPHINE PROCESS	12/586855	9/29/2009	8232397	7/31/2012	Granted

US	CONVENIENT OPERATIONS ON THE PRODUCTION OF OXYMORPHONE AND OXYCODONE	12/595519	10/12/2009	8309727	11/13/2012	Granted
US	CRYSTALLINE FORMS OF NALTREXONE HYDROCHLORIDE	12/595543	10/12/2009	8399475	3/19/2013	Granted
US	IMPROVED PROCESS FOR THE PREPARATION OF 6ALPHA-HYDROXY-N-ALKYLATED OPTIATES IN ONE POT	12/630171	12/3/2009	8273888	9/25/2012	Granted
US	IMPROVED PROCESS FOR THE PREPARATION OF 6ALPHA-HYDROXY-N-ALKYLATED OPTIATES IN ONE POT	12/630192	12/3/2009	8524904	9/3/2013	Granted
US	ESTERIFICATION OF THREO-ACID(RITALINIC ACID) USING ORTHOESTERS AS WATER SCAVENGERS	12/652894	1/6/2010	8283472	10/9/2012	Granted
US	CRYSTALLINE FORMS OF NALTREXONE METHOBROMIDE	12/668218	1/8/2010	8383649	2/26/2013	Granted
US	PREPARATION OF N-ALKYLATED OPIATES BY REDUCTIVE AMINATION USING ASYMMETRIC HYDROGEN TRANSFER	12/668900	1/13/2010	8729266	5/20/2014	Granted
US	IMPROVED PROCESS FOR THE REDUCTIVE ALKYLATION OF NORMORPHINANS	12/706909	2/17/2010	8431701	4/30/2013	Granted
US	METHOD FOR THE PREPARATION OF NOVEL NEW (+) MORPHINANIUM OXIDES	12/710383	2/23/2010	8563727	10/22/2013	Granted
US	PROCESSES FOR THE PREPARATION OF NEW MIRROR IMAGE ENANTIOMERS OF MORPHINANIUM QUATERNARY SALTS	12/710379	2/23/2010	8436174	5/7/2013	Granted
US	New mirror image enantiomers of functionalized 6-hydroxy or 6-amino-morphinans	12/710390	2/23/2010	8563724	10/22/2013	Granted
US	CATALYTIC ISOMERIZATION OF AN ALLYL ALCOHOL TO A SATURATED KETONE	12/757064	4/9/2010	8293907	10/23/2012	Granted
US	CATALYTIC ISOMERIZATION OF MORPHINE DERIVATIVES TO HYDROMORPHONE DERIVATIVES	12/757098	4/9/2010	9040705	5/26/2015	Granted
US	SYNTHESIS OF 2, 4-DIMETHYLBENZHYDRYL (DMBH) RESIN AS A NEW SOLID SUPPORT FOR FMOC-CHEMISTRY	12/773324	5/4/2010	8742028	6/3/2014	Granted
US	PREPARATION OF 6 ALPHA-AMINO MORPHINANS BY CATALYTIC HYDROGEN TRANSFER	12/797642	6/10/2010	8519133	8/27/2013	Granted
US	PREPARATION OF 6ALPHA-AMINO NORMORPHINANS BY CATALYTIC HYDROGEN TRANSFER	12/797640	6/10/2010	8471023	6/25/2013	Granted
US	NEW PURIFICATION PROCESS FOR BUPRENORPHINE USING PREPARATIVE REVERSED PHASE CHROMATOGRAPHY	12/818230	6/18/2010	8492547	7/23/2013	Granted

US	NEW 3-OXY PRODRUGS OF HYDROMORPHONE	12/833025	7/9/2010	8623888	1/7/2014	Granted
US	NEW BENZYLIC OXIDATION METHOD FOR THE PREPARATION OF 10-KETO AND 10-HYDROXY ALKALOIDS	12/876284	9/7/2010	8314237	11/20/2012	Granted
US	AN IMPROVED METHOD FOR THE PREPARATION OF HYDROCODONE FROM THEBAINE WITH REDUCED IMPURITY AND COLOR FORMATION	12/885851	9/20/2010	8399671	3/19/2013	Granted
US	A PROCESS FOR ISOMERIZING ALLYLIC ALCOHOLS TO CARBONYL COMPOUNDS	12/886621	9/21/2010	8383815	2/26/2013	Granted
US	ONE-POT PREPARATION OF HEXAHYDROISOQUINOLINES FROM AMIDES	12/889484	9/24/2010	8431705	4/30/2013	Granted
US	ONE-POT PREPARATION OF HEXAHYDROISOQUINOLINES FROM DIHYDROISOQUINOLINE	12/889502	9/24/2010	8415474	4/9/2013	Granted
US	PROCESS IMPROVEMENT FOR THE SYNTHESIS NALTREXONE METHOBROMIDE	12/529723	11/22/2010	8669366	3/11/2014	Granted
US	MICROWAVE MELT PACKAGING	13/015490	1/27/2011	8490795	7/23/2013	Granted
US	PACKAGING SOLUTIONS FOR TRANSDERMAL PATCH DISPOSAL	13/014876	1/27/2011	8925727	1/6/2015	Granted
US	CHILDPROOF STORAGE CONTAINER FOR TRANSDERMAL PATCHES	13/014896	1/27/2011	8910456	12/16/2014	Granted
US	LIQUID ADHESIVE ENCAPSULATION OF PILLS	13/015480	1/27/2011	9046403	6/2/2015	Granted
US	TIME BASED DIAL INDICATOR IN PILL CAP	13/015223	1/27/2011	8842501	9/23/2014	Granted
US	PRODUCTION OF OPIOID DRUGS BY TRANSITION METAL OR METAL COMPLEX CATALYZED REACTIONS AND IN SITU REMOVAL OF THE METAL BY METAL SCAVENGERS	13/093892	4/26/2011	8563725	10/22/2013	Granted
US	PEN-STYLE PILL DISPENSER	13/103234	5/9/2011	9016516	4/28/2015	Granted
US	ADHESIVE SECURING BLISTER PACKAGING	13/103247	5/9/2011	8342331	1/1/2013	Granted
US	A TANDEM PROCESSES FOR PREPARING N-ALKYL MORPHINANS	13/196921	8/3/2011	8703949	4/22/2014	Granted
US	N-DEMETHYLATION OF OPIATES CONTAINING A KETONE FUNCTIONAL GROUP	13/196929	8/3/2011	8624030	1/7/2014	Granted
US	MECHANICALLY SECURING BLISTER PACKAGING	13/215864	8/23/2011	8991606	3/31/2015	Granted
US	IMPROVED PROCESS, WITH INDUSTRIAL APPLICABILITY FOR THE PREPARATION OF ICH COMPLIANT SUFENTANIL BASE AND RELATED COMPOUNDS WITHOUT THE NEED FOR INDUSTRIAL CHROMATOGRAPHY	13/233227	9/15/2011	8946433	2/3/2015	Granted
US	COMPOUNDS HAVING AN ACYCLIC PORTION THAT INCLUDES AN N-N BOND AND USES THEREOF	13/319761	11/10/2011	8731655	5/20/2014	Granted

US	COMPOUNDS HAVING A CYCLIC PORTION THAT INCLUDES AN N-N BOND AND USES THEREOF	13/319771	11/10/2011	9186349	11/17/2015	Granted
US	A CONVENIENT AND EFFECTIVE WAY TO CONVERT (MINOR AMOUNT OF) ALPHA,BETA-UNSATURATED KETONE TO SATURATED KETONE IN THE FINISHING DRUG SUBSTANCE	13/294546	11/11/2011	8748611	6/10/2014	Granted
US	ADJUNCT THERAPEUTICS FOR THE INHIBITION OF TUMORIGENESIS IN TYPE II MEDIATED PHOTODYNAMIC THERAPY	13/383243	1/10/2012	8829020	9/9/2014	Granted
US	SYNTHESIS OF THE POTENTIALLY BIOLOGICALLY ACTIVE ALKALOIDS DERIVED FROM SINOMENINE	13/352668	1/18/2012	8614224	12/24/2013	Granted
US	REDUCTIVE ALKYLATION OF DIHYDROSINOMENINE AND AMINES USING HYDROGEN TRANSFER	13/491676	6/8/2012	9296699	3/29/2016	Granted
US	PRODUCTION OF KEY (+) ALKALOIDS FROM DIHYDROSINOMENINE WITHOUT THE ISOLATION OF INTERMEDIATE PRODUCTS	13/606370	9/7/2012	8624031	1/7/2014	Granted
US	ADHESIVE SECURING BLISTER PACKAGING	13/691766	12/1/2012	8627957	1/14/2014	Granted
US	ONE-POT PREPARATION OF HEXAHYDROISOQUINOLINES FROM AMIDES	13/749805	1/25/2013	8921561	12/30/2014	Granted
US	ONE POT FORMATION OF 6-BETA-NALOXOL FROM NOROXYMORPHONE	13/762431	2/8/2013	9012468	4/21/2015	Granted
US	MICROWAVE MELT PACKAGING	13/925680	6/24/2013	9005098	4/14/2015	Granted
US	New mirror image enantiomers of functionalized 6-hydroxy or 6-amino-morphinans	14/045009	10/3/2013	8946419	2/3/2015	Granted
US	ADHESIVE SECURING BLISTER PACKAGING	14/092559	11/27/2013	9120607	9/1/2015	Granted
US	ABUSE DETERRENT TABLETS FOR IMMEDIATE RELEASE WITH FUNCTIONAL BISECT	14/211307	3/14/2014	9301918	4/5/2016	Granted
US	ADJUNCT THERAPEUTICS FOR THE INHIBITION OF TUMORIGENESIS IN TYPE II MEDIATED PHOTODYNAMIC THERAPY	14/316415	6/26/2014	9518062	12/13/2016	Granted
US	ADJUNCT THERAPEUTICS FOR THE INHIBITION OF TUMORIGENESIS IN TYPE II MEDIATED PHOTODYNAMIC THERAPY	14/316443	6/26/2014	9527858	12/27/2016	Granted
US	PERMANENT LOCKING MEDICATION BOTTLE	14/488048	9/16/2014	9414989	8/16/2016	Granted
US	IMPROVED PROCESS FOR THE PREPARATION OF RADIOIODINATED 3-FLUOROPROPYL-NOR-BETA-CIT	14/496376	9/25/2014	9339565	5/17/2016	Granted
US	SYNTHESIS OF SUBSTITUTED BERBINES	14/504906	10/2/2014	9181237	11/10/2015	Granted

US	A CONVENIENT PREPARATION OF N-ALKYL MORPHINAN-6-OLS-FROM MORPHINAN -6-ONES	14/529368	10/31/2014	9499556	11/22/2016	Granted
US	A CONVENIENT OPERATION ON THE PRODUCTION OF 6 alpha-OXYCODOL FROM THEBAINE IN ONE-POT	14/533522	11/5/2014	9193737	11/24/2015	Granted
US	CATALYZED HYDROLYSIS OF NOR-MORPHINAN CARBAMATES	14/546617	11/18/2014	9127009	9/8/2015	Granted
US	PROCESS IMPROVEMENT FOR THE SYNTHESIS NALTREXONE METHOBROMIDE	14/569309	12/12/2014	9415044	8/16/2016	Granted
US	ADHESIVE SECURING BLISTER PACKAGING	14/716269	5/19/2015	9579252	2/28/2017	Granted
US	OXIDATIVE DEAROMATIZATION OF BERBINES	14/736752	6/11/2015	9593111	3/14/2017	Granted
US	AN IMPROVED PROCESS OF PREPARING TAPENTADOL	14/796069	7/10/2015	9556108	1/31/2017	Granted
US	BUPRENORPHINE STEP 3 YIELD INCREASED BY RECYCLING ALKALOIDS IN THE FILTRATE FROM A PREVIOUS BATCH	12/586856	9/29/2009	8232398	7/31/2012	Granted
US	COMPOSITION AND PROCESS FOR A SPHEROIDS OR GRANULES WITH TWO PULSE (IMMEDIATE AND DELAYED) RELEASE PROFILE	11/909270	9/21/2007	9713592	7/25/2017	Granted
US	COMPOSITIONS AND METHODS FOR PREPARING TAMPER RESISTANT PLATFORMS FOR EXTENDED SOLID DOSAGE FORMS	13/939357	7/11/2013	9730885	8/15/2017	Granted
US	Improved Stearate Composition and Method	11/154849	6/16/2005	7385068	6/10/2008	Granted
US	PROCESS IMPROVEMENT FOR THE SYNTHESIS NALTREXONE METHOBROMIDE	12/553144	9/3/2009	9040726	5/26/2015	Granted
US	SYNTHESIS OF SUBSTITUTED BERBINES	15/235312	8/12/2016			Published
US	METHYLPHENIDATE HCL TABLET FORMULATIONS PROVIDING ZERO-ORDER DRUG RELEASE	12/299944	11/7/2008			Published
US	MICROWAVE MELT FOR BLISTER CARDS	14/336357	7/21/2014			Published
US	TAMPER RESISTANT FORMULATIONS CONTAINING SODIUM BENTONITE AND PLURONICS	13/865244	4/18/2013			Published
US	TAMPER-RESISTANT IMMEDIATE RELEASE FORMULATIONS	13/865286	4/18/2013			Published
US	TAMPER-RESISTANT IMMEDIATE RELEASE FORMULATIONS	15/714137	9/25/2017			Pending
US	COMPOSITIONS AND METHODS FOR PREPARING TAMPER RESISTANT PLATFORMS FOR EXTENDED SOLID DOSAGE FORMS	15/420386	1/31/2017			Published
US	PROCESSES FOR THE LARGE SCALE MANUFACTURE OF SUFENTANIL CITRATE AND SUFENTANIL BASE	15/164483	5/25/2016			Published



US	SUSPICIOUS ORDER MONITORING PROGRAM	14/192971	2/28/2014			Pending
US	TR PAN COATER APPARATUS AND METHOD	15/568587	10/23/2017			Pending
US	SPRAY DRIED FORMULATIONS FOR THE MODIFICATION OF DRUG DISSOLUTION	14/722541	5/27/2015			Published
US	ABUSE DETERRENT IMMEDIATE RELEASE FORMULATIONS CONTAINING GLUCOMANNAN	14/788908	7/1/2015			Published
US	THREE STEP PROCESS FOR TAPENTADOL HYDROCHLORIDE	15/202670	7/6/2016			Published
US	GLUCOMANNAN CONTAINING PHARMACEUTICAL COMPOSITIONS WITH EXTENDED RELEASE AND ABUSE DETERRENT PROPERTIES	15/417541	1/27/2017			Published
US	TAMPER RESISTANT FORMULATIONS FOR ORAL SOLID EXTENDED RELEASE DOSAGE FORMS	15/464865	3/21/2017			Published